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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ERIC MONTFORT, CEDRIC SALENC,
XAVIER ROSER and LOIC GAUDIC

Appeal 2009-003764
Application 10/687,585
Technology Center 3600

Decided: September 29, 2009

Before LINDA E. HORNER, JOHN C. KERINS, and STEVEN D.A.
McCARTHY, *Administrative Patent Judges*.

Opinion for the Board filed by *Administrative Patent Judge* KERINS.

Opinion Concurring filed by *Administrative Patent Judge* McCARTHY.
KERINS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Eric Montfort et al. (Appellants) seek our review under 35 U.S.C. § 134 of the Examiner's final rejection of claims 4-16. Claims 1-3 were previously canceled. We have jurisdiction under 35 U.S.C. § 6(b) (2002). An oral hearing was held on September 10, 2009, with Falk Ewers, Esq. appearing on behalf of Appellants.

SUMMARY OF DECISION

We AFFIRM.

THE INVENTION

Appellants' claimed invention is to a satellite and an attitude control system for a satellite, the satellite having a plurality of elongated deployable members, in which the control system includes an attitude regulation loop with a corrector such that the bandwidth of the loop contains the lowest and most energetic frequencies of flexible modes of the elongated members. (Appeal Br., Claims Appendix, Claim 8). Independent claim 8 and dependent claim 16 are reproduced below, the former being representative of the overall claimed subject matter, and the latter containing claim elements alleged to not have adequate written descriptive support in Appellants' original disclosure:

8. A satellite, comprising:

a plurality of elongated deployable members; and

an attitude control system, comprising:

a gyroscopic actuator that supplies torque to the satellite when the satellite is subjected to a disturbing force or a disturbing torque; and

a control system that receives signals representing a current attitude of the satellite and that controls the gyroscopic actuator to supply a correction torque based on a difference between the current attitude of the satellite and a predetermined set attitude for the satellite;

wherein the gyroscopic actuator is one of a plurality of gyroscopic actuators, each gyroscopic actuator controlled by the control system to supply torque to maintain the predetermined set attitude of the satellite; and

wherein the control system comprises an attitude regulation loop, including a corrector such that the bandwidth of the loop contains the lowest and most energetic frequencies of flexible modes of the elongated members and the attitude regulation loop provides a control signal to control the gyroscopic actuators.

16. The satellite of claim 8, wherein the elongated members have a fixed length.

THE REJECTIONS

The Examiner relies upon the following as evidence of unpatentability:

Heiberg	US 5,944,761
Parvez	US 6,089,507

Aug. 31, 1999
Jul. 18, 2000

The Examiner has rejected:

(i) claims 15 and 16 under 35 U.S.C. § 112, first paragraph, as failing to meet the written description requirement therein;

(ii) claims 8, 10, 12 and 13 under 35 U.S.C. § 102(b) as being anticipated by Heiberg;

(iii) claims 4, 6, and 14-16 under 35 U.S.C. § 103(a) as being unpatentable over Heiberg; and

(iv) claims 5, 7, 9 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Heiberg in view of Parvez.

ISSUE

The Examiner found that the prior art satellite attitude control system disclosed in Heiberg includes a corrector employing a bandwidth of an attitude regulation loop that inherently includes the lowest and most energetic frequencies of the flexible modes of elongated members on the satellite.

Appellants contend that the control system relied on by the Examiner does not, of necessity, include a corrector employing a bandwidth including the lowest and most energetic frequencies of the flexible modes, and thus does not anticipate those claims rejected under § 102 nor render obvious those claims rejected under §103.

The issue to be decided on appeal is whether Appellants have demonstrated that the Examiner erred in his finding that the bandwidth of the claimed control system, which contains the lowest and most energetic frequencies of the flexible modes, is inherently disclosed in Heiberg.

FINDINGS OF FACT

The following enumerated findings of fact (FF) are supported by at least a preponderance of the evidence. *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Office).

FF 1. Appellants' Specification, while failing to explicitly state that the elongated members attached to the satellite are of a fixed length, contains statements to the effect that the dimensions of the elongated members are large relative to that of the body. (Specification, p. 5, ll. 9-11; p. 2, ll. 30-32).

FF 2. The Specification identifies two examples of disturbances, i.e., operation of thrusters and fuel slosh, as producing flexible modes which are apparently among the "lowest and most energetic frequencies." (Spec., p. 2, l. 33-35; p. 3, ll. 4-5).

FF 3. No detailed examples are provided as to what these frequencies would be for a particular satellite, nor is there any discussion as to what other possible disturbances might generate other flexible modes that are either among, or are excluded from, the "lowest and most energetic frequencies." (Specification, *passim*).

FF 4. Heiberg uses the snapping of solar panels due to sudden temperature variations only as one example of a disturbance that a satellite and its solar panels may experience, using the term, "for example", in both instances where this disturbance is discussed. (Heiberg, col. 1, ll. 15-23; col. 2, ll. 31-38).

FF 5. Heiberg uses the plural term, disturbances, in several places in describing that damping of vibrations caused by these disturbances is preferably controlled. (*See, e.g.*, Heiberg, col. 1, l. 15; col. 1, l. 34).

FF 6. Heiberg's provision of a circuit that is designed to null the known disturbance frequencies (Heiberg, col. 2, ll. 63-64), in order to operate properly, will necessarily employ a bandwidth that contains or includes the lowest and most energetic frequencies of the flexible modes of the solar panels.

PRINCIPLES OF LAW

An appellant has the burden on appeal to the Board to demonstrate error in the Examiner's position. *See Ex parte Yamaguchi*, 88 USPQ2d 1606, 1614 (BPAI 2008) (on appeal, applicant must show examiner erred); *Ex parte Fu*, 89 USPQ2d 1115, 1123 (BPAI 2008); *Ex parte Catan*, 83 USPQ2d 1569, 1577 (BPAI 2007); and *Ex parte Smith*, 83 USPQ2d 1509, 1519 (BPAI 2007). *See also In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) ("On appeal to the Board, an applicant can overcome a rejection [under § 103] by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.") (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)).

The purpose of the written description requirement is to ensure that an application or patent conveys, with reasonable clarity, to those skilled in the art that, as of the filing date sought, the applicant was in possession of the invention as now claimed. *See Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991). "[T]he written description requirement is satisfied

by the patentee's disclosure of 'such descriptive means as words, structures, figures, diagrams, formulas, etc., that fully set forth the claimed invention.'” *Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 969 (Fed. Cir. 2002) (quoting *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997)). Whether the written description requirement of 35 U.S.C. § 112, first paragraph, is met is a question of fact. *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566 (Fed. Cir. 1997), *cert. denied*, 523 U.S. 1089 (1998).

Anticipation under 35 U.S.C. § 102 requires that “each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Under principles of inherency, when a reference is silent about an asserted inherent characteristic, it must be clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991). Inherency may not be established by probabilities or possibilities. *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981).

A claim is unpatentable under 35 U.S.C. § 103(a) if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in

evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 407 (2007) (“While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”).

ANALYSIS

Claims 15 and 16--§112, First Paragraph, Written Description

The Examiner found that the limitation in claims 15 and 16 requiring the elongated members to have a fixed length is not described in the Specification in such a way as to reasonably convey to a person of ordinary skill in the art that Appellants were in possession of that claimed subject matter. (Answer 3). The Examiner based this finding on an underlying finding that there is no mention in the original disclosure about the length of the elongate members. (*Id.*) The Examiner further found that Appellants’ drawings do not provide an adequate written description because it is impossible to determine from the drawings if the elongated members depicted therein are a fixed length. (Answer 6). Further, the Examiner notes that the elongated members are described in the Specification as being “deployable”, and that persons of ordinary skill in the art would interpret this to mean that the elongated members can be unfurled and varied in length, or otherwise extended and varied in length. (Answer 6-7).

Appellants counter that the Figure 1 accompanying the Specification illustrates that the elongated members (solar generators being shown schematically) are of a fixed length, and that persons of ordinary skill in the art would understand that the solar generators and/or antennas described in

the application would be of a fixed length. (Appeal Br. 10). Further, Appellants also point to the absence from the drawing figures of means of showing movement, such as arrows connoting movement, or dashed lines or multiple views showing different stages of deployment, that might indicate or imply that the elongated members might be capable of having varied lengths.

Despite the rather primitive nature of the illustration of a satellite having elongated members in Figure 1, the figure clearly contains nothing to suggest that the elongated members are to be variable in length. Further, while the Specification fails to state that the elongated members are of a fixed length, it does contain statements to the effect that the dimensions of the elongated members are large relative to that of the body. (FF 1). Logic and common sense would appear to dictate that, were Appellants contemplating the use of other than fixed-length elongated members, there would have been some disclosure of this aspect included in the discussion of the relative sizes of the elongated members and the satellite body.

Considering the drawings and written description as a whole, in conjunction with the stated positions of the Examiner and Appellants, we find that Appellants' disclosure conveys, with reasonable clarity, that they were in possession of the subject matter of claims 15 and 16, namely a satellite having, *inter alia*, extended members of a fixed length, as of the time the application was filed. The rejection of claims 15 and 16 under 35 U.S.C. § 112, first paragraph, will not be sustained.

Claims 8, 10, 12 and 13--Anticipation by Heiberg

Appellants argue these claims as a group, presenting arguments only with respect to independent claim 8. Claim 8 will be taken as the

representative claim, and claims 10, 12 and 13, which depend from claim 8, will stand or fall with that claim.

Appellants contest the Examiner's finding of anticipation on the basis that the Heiberg patent is asserted to not disclose a control system that comprises an attitude regulation loop, and including "a corrector such that the bandwidth of the loop contains the lowest and most energetic frequencies of flexible modes of the elongated members."¹ (Appeal Br., Claims Appendix, Claim 8). Considerable portions of Appellants' arguments are directed to pointing out that Heiberg does not expressly discuss or disclose using a control bandwidth that contains the lowest and most energetic frequencies of the flexible modes of the elongated members of the satellite. (Appeal Br., *passim*; Reply Br., *passim*). The Examiner agrees, and bases this portion of the anticipation rejection on an assertion that this is an inherent feature of the control system of Heiberg. (Answer 4, 8).

More specifically, the Examiner's position is that, since the prior art system disclosed in the Heiberg patent is concerned with controlling vibration experienced in solar panels, then the system "must inherently have

¹ Appellants' Specification lends precious little insight into how the expression, "lowest and most energetic frequencies of flexible modes of the elongated members" is to be interpreted. The Specification identifies two examples of disturbances, i.e., operation of thrusters and fuel slosh, as producing flexible modes which are apparently among the "lowest and most energetic frequencies." (FF 2). No detailed examples are provided as to what these frequencies would be for a particular satellite, nor is there any discussion as to what other possible disturbances might generate other flexible modes that are either among, or are excluded from, the "lowest and most energetic frequencies." (FF 3). The claim term, on its face, appears to exclude only the highest and least energetic frequency that is produced by some undisclosed type of disturbance.

a bandwidth that contains the lowest and most energetic frequencies of the elongated members. Otherwise it would not operate correctly.” (Answer 4). The Examiner further asserts that the lowest and most energetic frequencies are an inherent result of the geometry and physical properties of the solar panels, which are the elongated members, using the claim terminology herein. Appellants attempt to challenge the former finding, but do not contest the latter.

The main thrust of Appellants’ challenge to the finding of inherency is that control systems employing feedback control do not necessarily have a bandwidth that covers the complete frequency spectrum in which disturbances can occur. (Reply Br. 7). Appellants then return the focus of the argument back to the explicit disclosure in Heiberg of the one specific example of a disturbance created due to the solar panels flexing due to exposure to thermal variances. (*Id.*). Appellants contend that the Heiberg control system is “only related to disturbances originated by thermal variances and the like”, and that, “[d]isturbances caused by sloshing of fuel ... are completely different and require a different accuracy of the model of the controller.”² (*Id.*). From this, Appellants posit that, “one cannot conclude that ‘lowest and more energetic frequencies’ that result from sloshing of fuel instead of from thermal variances are automatically covered

² Appellants assert, in connection with this contention, that the bandwidth of frequencies to be controlled depends on the accuracy of a model developed to represent the frequencies that may be generated by particular disturbances. (Reply Br. 7). Appellants further note that Heiberg does not disclose or suggest that the model of its compensator is designed to cover the complete bandwidth of all possible frequencies that can result from all possible disturbances. (*Id.*).

by the bandwidth of a feedback control system, as disclosed, for example, in Heiberg.” (*Id.*).

Appellants mischaracterize the disclosure of Heiberg as being directed to a control or correction system that is limited to damping only disturbances caused by thermal variances. Heiberg uses the snapping of solar panels due to sudden temperature variations only as one example of a disturbance that a satellite and its solar panels may experience. (FF 4). Heiberg speaks in several places about disturbances. (FF 5). Further, and perhaps most significantly, Heiberg explicitly states that, “the circuit of FIG. 1 [the circuit relied on by the Examiner] operates to null disturbance *frequencies* which are *known and constant*.” (Heiberg, col. 2, ll. 63-64). The disclosure of Heiberg itself thus contradicts Appellants’ attempt to have Heiberg interpreted more narrowly than is appropriate.

The Examiner’s view that Heiberg is directed to a system for controlling vibration of solar panels is a fair interpretation of that disclosure. The provision of a circuit that is designed to null the known disturbance frequencies will necessarily employ a bandwidth that contains or includes the lowest and most energetic frequencies of the flexible modes of the solar panels. (FF 6). Otherwise, as noted by the Examiner, it would not operate correctly. Appellants contention that, in order to function properly *in its bandwidth*³, Heiberg needs only to make sure that the compensator recognizes frequencies in its bandwidth, does not contradict the Examiner’s finding that the Heiberg device must include the lowest and most energetic

³ Appellants here again implicitly revert to the incorrect interpretation of Heiberg being directed to a control system limited to correcting for disturbances created by only thermal variances and the like.

frequencies in its bandwidth in order to operate to damp out the vibrations of the solar panels.

Appellants have thus not demonstrated error in the Examiner's findings as to the inherent feature in Heiberg, and thus have not demonstrated that the Examiner erred in finding claim 8 anticipated by Heiberg. The rejection of claim 8 will be sustained, and claims 10, 12, and 13 fall with claim 8.

Claims 4, 6, and 14-16--Obviousness over Heiberg

Appellants rely solely on the arguments for patentability advanced with respect to the alleged lack of anticipation of claim 8 by Heiberg in contesting this obviousness rejection. For the same reasons set forth above, we will sustain this rejection.

Claims 5, 7, 9 and 11--Obviousness over Heiberg and Parvez

Appellants again rely solely on the arguments for patentability advanced with respect to the alleged lack of anticipation of claim 8 by Heiberg in contesting this obviousness rejection. For the same reasons set forth above, we will sustain this rejection.

CONCLUSION

Appellants have established that the Examiner erred in rejecting claims 15 and 16 as failing to meet the written description requirement set forth in the first paragraph of 35 U.S.C. § 112.

Appellants have not established that the Examiner erred in rejecting claims 8, 10, 12 and 13 under 35 U.S.C. § 102(b) as being anticipated by Heiberg.

Appellants have not established that the Examiner erred in rejecting claims 4, 6, and 14-16 under 35 U.S.C. § 103(a) as being unpatentable over Heiberg.

Appellants have not established that the Examiner erred in rejecting claims 5, 7, 9, and 11 under 35 U.S.C. § 103(a) as being unpatentable over Heiberg in view of Parvez.

ORDER

The decision of the Examiner to reject claims 4-16 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2007).

AFFIRMED

mls

McCARTHY, *Administrative Patent Judge, concurring.*

I agree with the result reached by my colleagues. I also agree with my colleagues' analysis. I write separately to make a few additional points with respect to the rejection claims 8, 10, 12 and 13 under § 102(b).

I will limit my discussion to claim 8. Claim 8 recites a satellite including gyroscopic actuators controlled by a control system. The control system comprises an attitude regulation loop which provides a control signal to control the gyroscopic actuators. The attitude regulation loop includes "a corrector such that the bandwidth of the loop contains the lowest and most energetic frequencies of flexible modes of the elongated members."

The Specification defines "flexible modes" as low frequency, low amplitude oscillations of elongated members such as solar generators attached to a satellite caused when a disturbing torque is exerted on the body of the satellite. (Spec. 5, ll. 9-14.) The "lowest and most energetic frequencies of flexible modes of the elongated members" apparently depend on the structure of the satellite and the elongated members, as well as on the nature of the disturbing torque, in a manner which is not described in detail in the Specification. Claim 8 does not define the structure of the attitude regulation loop beyond the recitation of the regulator or place an upper limit on the bandwidth of the attitude regulation loop.

Column 2 of Heiberg describes a prior art fixed frequency rejection system for a spacecraft. (Heiberg, col. 2, ll. 15-17.) The system as depicted in Figure 1 of Heiberg includes a control system including an attitude regulation loop. The attitude regulation loop includes a compensator 52 and a filter 56. Heiberg describes the attitude control loop as being adapted to compensate for disturbances caused by "snapping" of solar panels due to

sudden temperature variations. (See Heiberg, col. 2, ll. 30-38 and 59-62.) As my colleagues point out, Heiberg does not describe the attitude regulation loop as capable of compensating only for disturbances caused by such “snapping” or as being incapable of compensating for lower frequencies which might alter the pointing direction of the satellite and thereby disrupt the satellite’s ability to function. Heiberg does not specify a bandwidth of either the filter 56 or the attitude regulation loop as a whole.

The Examiner found that Heiberg’s system must inherently have a bandwidth that contains the lowest and most energetic frequencies of the elongated members in order to operate correctly. (Ans. 4.) The recitation of “a corrector such that the bandwidth of the loop contains the lowest and most energetic frequencies of flexible modes of the elongated members” limits the corrector and the attitude regulation loop in functional terms. Where, as here, an examiner has reason to believe that a prior art structure similar in structural terms to that recited in a claim necessarily performs a recited function, the examiner may shift the burden to the applicant to prove that the recited function is not inherent. *In re Schreiber*, 128 F.3d 1473, 1478 (Fed. Cir. 1997). The Appellant must present evidence to meet this burden and cannot rely on attorney argument alone.

Here, the probative value of the disclosure of Heiberg and the weight of the Examiner’s reasoning outweighs the probative value of any evidence submitted by the Appellants tending to disprove inherency. The Appellants provide no evidence in the form of affidavits or declarations (see App. Br. 20), even so much as an expert opinion denying the Examiner’s findings. Although the Appellants’ Specification includes Figures 4a, 4b and 5 which appear to provide frequency and phase responses of a working example of

an attitude regulation loop (*see* Spec. 6, l. 26 – 7, l. 1), the Appellants have not explained how these drawing figures might tend to rebut the Examiner's findings, if at all.

The Appellants' reliance on reference numeral *116*, Figure 2 of Heiberg (*see* App. Br. 12) is misplaced: Figure 2 refers to Heiberg's preferred embodiment and not to the prior art structure on which the Examiner relies in rejecting claim 8 (*see* Ans. 3-4). Furthermore, since reference numeral *116* refers to a schematic diagram of a frequency response with no labeling of the ordinate or abscissa (*see, e.g.,* Heiberg, col. 2, ll. 1-2 and col. 3, ll. 21-24), the diagram is of little probative value.

Since the Appellants have not met their burden to overcome the Examiner's finding of inherency, the Appellants have not shown that the finding, or the Examiner's decision to reject claims 8, 10, 12 and 13 under § 102(b), is in error.

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